DIMENSION® 600/2000 PBX
ENERGY COMMUNICATION SIGNALING UNIT (ECSU) TEST
(PROC 534)

1. GENERAL

1.1 This section is issued in order to make available the information contained in the Administration and Maintenance Manual, 500-497, PROC 534.

1.2 The attachment provides test procedures for ECSUs.

ATTACHMENT

PROC 534 (11 pages)

Reason for Issue:
New Section

Manager, Denver PBX PECC

PROCEDURE 534 - ENERGY COMMUNICATION SIGNALING UNIT TEST

A. DESCRIPTION

Procedure 534 should be used when the following conditions exist:

- The NETWORK OTHER–515 and the MINOR alarm indicators on the Alarm Panel are turned on.
- Procedure 515 indicates Procedure 534 should be used to find the source of the alarm.

Procedure 534 is used to:

- Display failure history of energy communication signal units (ECSUs) as recorded by on-line maintenance.

Test all ECSUs.

Test a selected ECSU for correct operation.

Retire the alarm when the local failure table is emptied or contains only entries that are in-use circuits.

Three tests are available:

Test 1 – Failure history.

Test 2 – Tests all ECSUs.

Test 3 – Tests a selected ECSU continuously.

TEST 1:	TEST 2:	TEST 3:	FAILURE CODES (FIELD 11):	OTHER CODES:	NOTES:
DISPLAYS FAILURE HISTORY. USE 'NEXT CIRCUIT' TO DISPLAY NEXT FAILED CIRCUIT. USE 'CLR DATA', 'EXECUTE' TO CLEAR FAILURE HISTORY.	TESTS SIGNALLERS FROM DISPLAYED LOCATION. USE 'NEXT CIRCUIT' TO DISPLAY FAILURES. USE 'CLR DATA', 'EXECUTE' TO CLEAR FAILURES DETECTED BY THIS PROCEDURE.	TSTS A PARTICULAR SIG UNIT CONTSLY. USE 'NEXT CIRCUIT' TO ADVANCE TO NEXT CIRCUIT. USE 'NEXT UNIT' TO ADVANCE TO NEXT UNIT TYPE.	0=PASS 1=NO SIG UNIT RESPONSE 2=SHOULD BE ACTIVE 3=SHOULD BE INACTIVE 4=RESPONSE OUT OF TOL 7=CIRCUIT HIGH AND WET 8=CIRCUIT IN USE 9=NET ORDER INCOMPLETE	FIELD 2: 0=VERIFY PRESENT STATE 1=TEST BOTH STATES FIELD 3: 0=GUEST ROOM 1=INDIVIDUAL LOAD 2=BOTH 0 AND 1 FIELD 10: 0=CKT NOT ALARMED 1=CIRCUIT ALARMED FIELD 12: 0=TN NOT PRESENT 1= TONE PRESENT SPECIAL ERROR CODE: 80=UNIT TYPE DOES NOT MATCH EQUIPMENT LOCATION	1. FOR TEST 1, CONTAINS TOTAL SIG UNITS IN SYSTEM. BEFORE EXECUTING TEST 2, CONTAINS TOTAL SIGNALLERS OF DISPLAYED UNIT TYPE. AFTER EXECUTION OF TEST 2, CONTAINS NUMBER OF SIGNAL UNITS TESTED. 2. AFTER COMPLETION OF TEST 2, FIELD 14 ALTERNATES DISPLAY OF TOTAL FAILURES RECORDED AND TOTAL ACTUAL FAILURES (EXCLUDING FAILURE CODES 7 & 8).

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TEST NO	TEST 2 & 3 MODE	TEST 2 & 3 UNIT TYPE	EQUIPMENT LOCATION TEST 3 / TEST 2 MODULE	CAB	CARR	SLOT	CKT	TEST 3 EXTENSION NUMBER	TEST 1 ALARM STATUS	FAILURE CODE	TEST 3 TONE STATUS	NUMBER OF SIGNAL UNITS (SEE NOTE 1)	TOTAL FAILURES RECORDED (SEE NOTE 2)	FAILING CIRCUIT INDEX
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2.	1.	0.	0.	0.	1.	2.	-.	- - - -	-.	-.	-.	15.	1.	1.

FIELD 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

B. FIELD DEFINITIONS AND CODES

Field	Code	Definition
1	1-3	Test number.
2		Mode of operation:
	0	Verify ECSU state against that recorded in status memory.
	1	Test ECSU in both active and inactive state*.
3		Type of ECSU:
	0	Guest room.
	1	Individual load.
	2	Either 0 or 1.
4	0-24	Module number. See Table 2-3 for encode range.
5	0-4	Cabinet number.
6	0-4	Carrier number.
7	2-9, 11-18	Slot number in-line port carrier.
	5-10, 12-18	Slot number in-line group control carrier.
8	0-3	Circuit number.
9	Any 2-, 3-, or 4-digit number	Line extension number assigned to equipment location (fields 4-8).
10		Alarm status:
	0	Did not cause alarm.
	1	Did cause alarm.
11		Failure code:
	0	Pass.
	1	No response.
	2	ECSU should be active.
	3	ECSU should be inactive.
	4	Response out of tolerance.
	7	Circuit high and wet.
	8	Circuit in use.
	9	Network order incomplete.

* The mode-1 operation forces the ECSU state to active (energy is disabled) and verifies the condition. Then the ECSU state is forced to inactive (energy is enabled) and this state is verified. Upon completion, the ECSU is returned to its original state.

B. FIELD DEFINITIONS AND CODES (Contd)

Field	Code	Definition
12		Tone status
	0	Not present
	1	Present
13	*	Test 1: Total ECSUs in the system
		Test 2 (before executing): Total ECSUs of the type displayed in field 3
		Test 2 (during and after execution): Total ECSUs tested
14	0-99	Test 1: Total ECSUs recorded as failing by on-line maintenance
		Test 2: Total failures alternated with number of failures that are not failure code 7 or 8
15		Failure index:
		Test 1:
	0	Failure summary
	1-6	Index into failure history
15 (Contd)		Test 2:
	0	Failure summary
	1-99	Index into failure history

* Varies according to system configuration.

C. TEST PROCEDURES

A list of ECSU tests, what each one does, and how each is run follows:

Call in Procedure 534:

PROC NO.; 534; ENTER

Test 1 is automatically selected.

C. TEST PROCEDURES (Contd)

Depressing the NEXT TEST key repeatedly advances the procedure to the desired test.

Selection of Test 3 may result in the display of a "default" circuit. A default circuit is the last failing circuit displayed. If there is no default circuit, the fields are dashed. The location of this circuit is automatically displayed on entry to Test 3, which requires an equipment location entry before it can be run.

The identity of the default circuit is redefined when a failing circuit is displayed from the failure tables used in Test 1 or 2, or when a failure is detected by Test 3.

Test 1:

Test 1 provides a failure history of ECSU failures.

To start the test, select Test 1. All fields are dashed except field 13, which displays the total ECSUs in the system. Depressing EXECUTE takes a "snapshot"of the fialure summary and displays it on the MAAP. If one or more failures have occurred, the total number of failures is displayed in field 14, an index of 0 in field 15, and field 13 is dashed.

Depressing the NEXT CIRCUIT key displays the first failing circuit in the failure history. The display includes the following:

Field	Contents
3	Unit type
4-8	Equipment location of failing circuit
9	Extension number of failing circuit
10	Alarm status
11	Failure code associated with the first failure of the circuit displayed
14	Total failure recorded
15	Failing circuit index

After the first failing circuit is displayed, depressing the NEXT CIRCUIT key repeatedly displays the remaining failing circuits. Depressing NEXT CIRCUIT after all failures have been displayed dashes all fields. Depressing NEXT CIRCUIT again causes Test 1 to be executed, starting the sequence over with the failure summary.

C. TEST PROCEDURES (Contd)

Refer to paragraph 2C in Section 4 for information on clearing the failure history.

Test 2:

> **CAUTION**
>
> **Be sure that all information needed from Procedure 534 Test 2 has been noted before calling in a different procedure. Once another procedure is started, or Procedure 534 reset, the local failure table in Test 2 of Procedure 534 is destroyed.**

Test 2 tests all ECSUs in the system at a rate of about 1000 units per hour.

> **NOTE**
>
> Mode 1, Test 2 is intended as an installation test and stops after 99 real failures have been recorded. Before testing can be started again, repairs must be made and some of the local failure table entries must be cleared.
>
> After the system has been installed and operating, use Test 1 to record failures and Test 3 to test individual failures.
>
> It must be emphasized that Test 2, mode 1 is time consuming and affects the customer's equipment. That is, a device controlled by an ECSU will be turned on and off when mode 1 testing in Test 2 (or Test 3) is run. This condition may cause problems for the customer and the implications of running the tests should be considered carefully.

Upon entry into Test 2, fields 2 and 3 display default values of zero. The corresponding total ECSUs in the system are displayed in field 13. Field 14 displays the total failed circuits (those detected by on-line maintenance and alarmed) and field 15 displays zero, indicating the failure summary.

To start the test, select Test 2 and depress the EXECUTE key. The WAIT indicator on the MAAP turns on. Field 15 is dashed and testing of the ECSUs starts from the location specified in fields 4 through 7. As testing continues, the following fields are updated.

Field	Contents
2	Mode of operation
3	Unit type
4-7	Equipment location
13	Total ECSUs tested
14	Total ECSU entries in local failure table (failed or in-use)

If a failure is detected, the NETWORK OTHER-515 and MINOR alarm indicators are turned on. On completion of the test, the WAIT indicator turns off and the display is as follows:

C. TEST PROCEDURES (Contd)

Field	Contents
2	Mode of operation
3	Unit type
4-7	Equipment location of failed circuit or dashes (see Note)
13	Total ECSUs tested
14	Total failures in local table
15	0, Index into failure history

NOTE

If the local failure table is filled before the system has been completely tested, fields 4 through 7 display the equipment location at which testing stopped. Field 14 displays 99, the maximum number of entries possible in the local failure table. Field 15 displays a 0 entry. Dashes in fields 4 through 7 indicate that testing stopped at the end of the system.

When there are 99 entries in the local failure table, Test 2 searches through it for in-use entries. These are tested in an attempt to free space for additional failing ECSUs.

On conclusion of the test (WAIT turns off), the NEXT CIRCUIT key can be depressed repeatedly to display the failing circuits. Depressing the NEXT CIRCUIT key after all the circuits have been displayed results in the following:

Field	Contents
3	Unit type: either last encode entered or default 0
4-12	Dashes
13	Number of ECSUs of unit type designated in field 3
14	Total number of failures
15	Failure index 0

Depressing NEXT CIRCUIT once more displays the first failed circuit.

Testing stops when all energy signal unit circuits have been tested, when 99 failures have been detected, or when the STOP key has been depressed. The WAIT indicator turns off and the failure summary is displayed.

If no response is received from an energy signal unit, Test 2 waits for 5 minutes and then retests. If there is still no response, a failure is recorded.

C. TEST PROCEDURES (Contd)

High and wet circuits and in-use circuits are placed in the local failure table (failure codes 7 and 8) and are camped on after all units have been tested. During camp-on, the IN-USE indicator turns on and fields 4 through 7 display the equipment location being tested.

If the local failure table contains the maximum 99 entries, Test 2 searches through it for in-use entries. These are tested in an attempt to free space for additional failing ECSUs. If no in-use entries are found, the test will stop. If all in-use entries are still in use, the procedure will continue to cycle through the table.

Meanwhile, the IN-USE indicator is on and fields 4 through 7 display the equipment location which is being tested. Fields 13 and 14 will change as testing is completed.

The STOP key is used to stop the test while it is executing. Displayed are the following:

Field	Contents
4-7	Equipment location at which the test stopped or dashes
13	Total number of units tested
14	Alternates between the total entries in the local failure table and the total failing circuits in the local failure table (real failures)

The NEXT UNIT key can be used only upon entry to Test 2 or when the test is in the failure summary state (ie, field 15 = 0). Depressing NEXT UNIT steps the display through all the unit types (field 3) in the system.

To change from mode 0 testing to mode 1 testing can be done only by using the change field sequence ie,

CHANGE FIELD; 2; ENTER; 1; ENTER; EXECUTE

Testing starts from the location displayed in fields 4 through 7. The mode 1 operation forces the ECSU state to active (energy is disabled) and verifies the condition. Then the ECSU is forced to inactive (energy is enabled) and this state is verified. Upon completion, the ECSU is returned to its original state.

Each carrier is tested as a unit by making two passes through it; first in the active state, then the inactive state. After both states are tested, field 13 displays the total number of ECSUs tested. During this testing field 14 is updated to display the total number of failed ECSUs.

C. TEST PROCEDURES (Contd)

Refer to paragraph 2C in Section 4 for information on clearing the failure history.

Test 3:

Test 3 is used to continuously test any circuit suspected of having intermittent energy signal unit failures or to help trace wiring problems. The test checks out an individual circuit and its associated energy signal unit.

Test 3 can be intitialized in three ways:

1. If no failures have occurred (default circuit does not exist), fields 4 through 8 blink dashes to indicate that an entry must be made in these fields or in field 9 (extension number). After this data is entered in these fields, the test can be started. If desired, the eqipment location can be entered in fields 4 through 8 instead, using the change sequence; eg:

   CHANGE FIELD; 4; ENTER; (Module); ENTER; (Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER; (Circuit); ENTER; DISPLAY; EXECUTE

   If an extension number is entered using the change field sequence, on subsequent entries into Test 3 the extension number (field 9) will be the default entry field. Field 4 may be restored as the default entry field by entering values into it using the change field sequence or by resetting the procedure.

> **NOTE**
>
> Either an equipment location or an extension number must be entered in Test 3 before the test can be run (EXECUTE depressed).

2. If no failures are displayed (no default circuit exists), depressing the NEXT UNIT key displays the next unit type (field 3). The NEXT CIRCUIT key can then be used to increment through all the equipment locations of the unit type displayed. NEXT UNIT can be used to increment through all the unit types in the system.

3. If a failure has been displayed or found in Test 3, a default circuit is displayed. The default circuit is the last ECSU circuit that was displayed. Either the default circuit can be tested or another circuit can be selected, using method 1 or 2 described above.

C. TEST PROCEDURES (Contd)

To start the test, depress EXECUTE.

> **NOTE**
>
> Special error code 80 appears in the ERROR display when EXECUTE is depressed and the circuit type encode (field 3) is not consistent with the equipment location (fields 4 through 8) or extension number (field 9).

Field 11 flashes a dash to indicate the test is running for the first time. If a failure occurs, the NETWORK OTHER-515 and MINOR alarm indicators are turned on. The failure code for the first failure detected is locked into field 11 and flashed. The flashing display indicates the test is being run continuously.

During Test 3, field 12 is updated to indicate tone status.

Depressing NEXT CIRCUIT steps the test to the next circuit having the unit type displayed in field 3. The NEXT UNIT key is used the same as in Test 2.

> **NOTE**
>
> Correcting a fault does not clear the failure code. To clear the failure code, Test 3 must be rerun; eg:
>
> STOP; EXECUTE

When it is desired to test another circuit, stop the test, select the new circuit, and restart the test; eg:

STOP; (Select new circuit); EXECUTE

When mode 0 testing is selected in Test 3, field 12 displays the tone status. Field 11 blinks to indicate that the ECSU is being tested, or displays a 7 or 8 to indicate the line is not available. When the circuit passes, field 11 displays a 0 failure code. If the circuit fails, field 11 displays the appropriate failure code. In either case testing continues.

D. REPAIR GUIDE

When ECSU fault is indicated, the following steps should be performed by the order shown to isolate and repair the faulty unit.

D. REPAIR GUIDE (Contd)

NOTE

Test 2 is intended as an installation test. Run through Test 2, which tests about 1000 ECSUs per hour. Testing will stop after 99 real failures have been recorded. Before testing can be started again, repairs must be made and some of the local failure table entries must be cleared.

After the system has been installed and operating, use Test 1 to record failures ant Test 3 to test individual test failures.

Step	Isolation Procedure
1.	Using Test 1, step through the failure history and record the results.
2.	Execute Test 2 to determine if an ECSU is failing, and record test results.
3.	Based on test results, take the corrective action indicated, in the order listed, in Table 534-1.
4.	If intermittent ECSU failures or wiring problems are suspected, use Test 3 to continuously test suspect circuits.
5.	After all failures have been corrected, repeat Test 1 to clear the failure history and Test 2 or Test 3 to retire the alarms.

NOTE

The alarm is retired when the local failure table is emptied or contains only entries that are in-use circuits. Entries in the local failure table may be removed as follows:

(a) Any entry is removed by passing Test 2 or 3 in either mode (field 2 may display 0 or 1).

(b) All entries not alarmed by on-line maintenance are deleted in Test 2 only by the CLEAR-DATA; EXECUTE sequence. Using the clear data sequence in Test 1 clears the failures that were recorded by on-line maintenance.

D. REPAIR GUIDE (Contd)

Table 534-1. ECSU Test Repair Procedure

Failure Code	Corrective Action
1	Test the circuit using Test 3, operation mode 1. It may take about 10 minutes to duplicate the failure code. If the failure code recurs: For a guest room: Using Procedure 550, place a test call to the circuit in question. If this fails, replace circuit pack LC03 and rerun Procedure 534, Test 3, in operation mode 1. Using Procedure 581 Test 3, test the line circuit. If this fails, replace circuit pack LC03 and rerun Procedure 534, Test 3, on the circuit. If the failure code recurs, replace the ECSU. For an individual load: Using Procedure 581 Test 3, test the line circuit. If this fails, replace circuit pack LC03 and rerun Procedure 534, Test 3, on the circuit. If the failure code recurs, replace the ECSU.
2-3	Test the circuit using Test 3, operation mode 1. It may take about 10 minutes to duplicate the failure code. If the failure recurs, replace the ECSU circuit pack.
4	Test the circuit using Test 3, operation mode 1. It may take about 10 minutes to duplicate the failure code. If the failure recurs, replace the ECSU circuit pack.
7	Test station is high and wet. Run Test 3 to confirm the condition (test time is 2 seconds if it is still high and wet). If confirmed, perform the following steps until the problem is cleared: 1. Replace LC03 and retest. 2. Check if station is off-hook. 3. Replace ECSU. 4. Check wiring.
8	This failure code indicates that the station associated with the ECSU is in use, preventing testing.
9	Test the circuit using Test 3. If the failure code recurs, use Procedure 506 to check for a scanner/distributor failure.